

WHAT IS CLAIMED IS:

1. An optical device, comprising:
a first semiconductor substrate having an optical part and a first pad;
a second semiconductor substrate having an integrated circuit and a second pad being stacked under the first semiconductor;
a through-hole continuously extending through the first and the second semiconductor substrate; and
a conductive part disposed on an inside of the through-hole.
2. The optical device according to claim 1,
the optical part being formed on a side of a surface of the first semiconductor substrate opposite to the second semiconductor substrate.
3. The optical device according to claim 1,
the integrated circuit being formed on a side of a surface of the second semiconductor substrate opposite to the first semiconductor substrate.
4. The optical device according to any one of claim 1,
the through-hole being formed so as to extend through at least one of the first and the second pad.
5. The optical device according to any one of claim 1, further comprising:
an insulating layer formed on the inside of the through-hole, the conductive part being disposed on the insulating layer.
6. The optical device according to claim 1, the conductive part having an electrical connection on a side of a surface of the second semiconductor substrate opposite to the first semiconductor substrate.
7. The optical device according to claim 6, a pitch of the electrical connection being larger than a pitch of the second pad.
8. The optical device according to claim 6, further comprising:
an external terminal provided on the electrical connection.
9. The optical device according to claim 6, further comprising:
a resin layer formed on the side of the surface of the second semiconductor substrate opposite to the first semiconductor substrate, the electrical connection being formed on the resin layer.
10. The optical device according to claim 9, the resin layer being formed in an area overlapping the optical part.
11. The optical device according to claim 1, further comprising:

an intermediate layer interposed between the first and the second semiconductor substrate.

12. The optical device according to claim 11, the intermediate layer including a metallic layer formed in an area overlapping the optical part.

13. The optical device according to claim 1, the optical part having a plurality of light-receiving elements.

14. The optical device according to claim 13,
each of the plurality of light-receiving elements being arrayed for image sensing.

15. An optical module, further comprising:
an optical device according to claim 1;
a wiring substrate facing the second semiconductor substrate; and
a substrate member holding a lens mounted on the wiring substrate and being provided above the first semiconductor substrate.

16. A semiconductor apparatus, comprising:
a first semiconductor substrate having a first integrated circuit and a first pad;
a second semiconductor substrate having a second integrated circuit and a second pad being stacked under the first semiconductor substrate;
a through-hole continuously extending through the first and the second semiconductor substrate; and
a conductive part disposed on an inside of the through-hole, the first integrated circuit being formed on a side of a surface of the first semiconductor substrate opposite to the second semiconductor substrate, and
the second integrated circuit being formed on a side of a surface of the second semiconductor substrate opposite to the first semiconductor substrate.

17. The semiconductor apparatus according to claim 16,
the through-hole being formed so as to extend through at least one of the first and the second pad.

18. The semiconductor apparatus according to claim 16, further comprising:
an insulating layer formed on the inside of the through-hole, the conductive part being formed on the insulating layer.

19. The semiconductor apparatus according to claim 16, the conductive part having an electrical connection on the side of the surface of the second semiconductor substrate opposite to the first semiconductor substrate.

20. The semiconductor apparatus according to claim 19, a pitch of the electrical connection being larger than a pitch of the second pad.

21. The semiconductor apparatus according to claim 19, further comprising:
an external terminal provided on the electrical connection.

22. The semiconductor apparatus according to claim 19, further comprising:
a resin layer formed on the side of the surface of second semiconductor substrate opposite to the first semiconductor substrate, the electrical connection being formed on the resin layer.

23. An electronic apparatus, comprising:
the optical device according to claim 1.

24. A manufacturing method of a semiconductor apparatus, comprising:
stacking a first semiconductor substrate with a first integrated circuit and a first pad on a second semiconductor substrate with a second integrated circuit and a second pad;

forming a through-hole continuously extending through the first and the second semiconductor substrate; and

forming a conductive part disposed on an inside of the through-hole.

25. The manufacturing method of a semiconductor apparatus according to claim 24, the first integrated circuit being formed on a side of one surface of the first semiconductor substrate, and the second integrated circuit being formed on a side of one surface of the second semiconductor substrate, the first and the second semiconductor substrate being stacked in the stacking step such that another surface of one semiconductor substrate faces another surface of the other semiconductor substrate.

26. The manufacturing method of a semiconductor apparatus according to claim 24, the through-hole being so formed in the forming a through-hole step as to extend through at least one of the first and the second pad.

27. The manufacturing method of a semiconductor apparatus according to claim 24, further comprising:

a step of forming an insulating layer on the inside of the through-hole prior to the forming a conductive part step, the conductive part being formed on the insulating layer in the forming a conductive part step.

28. The manufacturing method of a semiconductor apparatus according to claim 24, the conductive part being formed in the forming a conductive part step so as to have an

electrical connection on the side of the surface of the second semiconductor substrate opposite to the first semiconductor substrate.

29. The manufacturing method of a semiconductor apparatus according to claim 28, the conductive part being formed in the forming a conductive part step so that a pitch of the electrical connection is larger than a pitch of the second pad.

30. The manufacturing method of a semiconductor apparatus according to claim 24, further comprising:

forming a resin layer on the side of the surface of the second semiconductor substrate opposite to the first semiconductor substrate.